CLAIMS

1. A structure comprising a substrate bearing, on at least part of its surface, an antisoiling layer having a photocatalytic property, based on titanium dioxide (TiO_2) at least partly crystallized in its anatase form, characterized in that it includes, immediately beneath at least one TiO_2 layer, an underlayer (UL) having a crystallographic structure that has assisted in the crystallization, by heteroepitaxial growth in the anatase form, of the TiO_2-based upper layer, the photocatalytic property having been acquired without any heating step.

2. The structure as claimed in claim 1, characterized in that the underlayer (UL) is based on a compound crystallized in a cubic or tetragonal system and having a lattice cell dimension equal to that of TiO_2 crystallized in anatase form to within ± 8%, especially to within ± 6%.

3. The structure as claimed in either of claims 1 and 2, characterized in that the underlayer (UL) consists of $ATiO_3$, A denoting barium or strontium.

4. The structure as claimed in one of claims 1 to 3, characterized in that the underlayer (UL) has a thickness of between 10 and 100 nm.

5. The structure as claimed in one of claims 1 to 4, characterized in that the substrate consists of a sheet, whether plane or with curved faces, of monolithic or laminated glass, glass-ceramic or a hard thermoplastic, such as polycarbonate, or else consists of glass or glass-ceramic fibers, said sheets or said fibers having, where appropriate, received at least one other functional layer before application of the underlayer (UL).

6. The structure as claimed in claim 5, in which the substrate is made of glass or glass-ceramic, characterized in that at least one functional layer subjacent to the underlayer (UL) is a layer forming a barrier to the migration of alkali metals from the glass or glass-ceramic.

7. The structure as claimed in either of claims 5 and 6, characterized in that at least one functional layer subjacent to the underlayer (UL) is a layer having an optical functionality, a thermal control layer or a conducting layer.

8. The structure as claimed in one of claims 5 to 7, in which the substrate is made of glass or glass-ceramic, characterized in that the substrate has received a layer acting as a barrier to the migration of alkali metals from the glass or glass-ceramic, followed by a monolayer, bilayer or trilayer having an optical functionality.

9. The structure as claimed in one of claims 1 to 8, characterized in that the TiO_2 base layer consists of TiO_2 alone or of TiO_2 doped with at least one dopant chosen in particular from: N; pentavalent cations such as Nb, Ta and V; Fe; and Zr.

10. The structure as claimed in one of claims 1 to 9, characterized in that the TiO_2 layer has been deposited at room temperature by vacuum sputtering, where appropriate magnetron and/or ion-beam sputtering.

11. The structure as claimed in one of claims 1 to 8, characterized in that the underlayer (UL) has been deposited at room temperature by vacuum sputtering, where appropriate magnetron and/or ion-beam sputtering.

12. The structure as claimed in one of claims 3 to 8, characterized in that $ATiO_3$ has been deposited at room temperature by vacuum sputtering, where appropriate magnetron and/or ion-beam sputtering, using ceramic targets chosen from $ATiO_3$, $ATiO_{3-x}$ where $0 < x \leq 3$, and ATi,
the supply being a radiofrequency supply and the atmosphere in the sputtering chamber containing only argon when $ATiO_3$ is used as target, the supply being a DC or AC supply and the reactive atmosphere in the sputtering chamber containing oxygen and argon when ATi or $ATiO_{3-x}$ is used as target,
the TiO_2 layer having been deposited in a following step in the same sputtering chamber.

13. The structure as claimed in one of claims 1 to 12, characterized in that the TiO_2 layer is coated with at least one overlayer of a material that does not disturb the antisoiling function of the TiO_2 layer, such as SiO_2.

14. The application of $ATiO_3$ to the formation of a layer for assisting in the crystallization, in the anatase form by heteroepitaxial growth, of an optionally doped $ATiO_2$-based upper layer, A denoting barium or strontium.

15. A process for producing a structure as defined in one of claims 1 to 13, characterized in that an $ATiO_3$ underlayer, A denoting barium or strontium, is deposited on a substrate made of glass or glass-ceramic or hard polycarbonate-type plastic, of the sheet type, or on glass or glass-ceramic fibers, followed by an optionally doped TiO_2 layer, at least one overlayer of a material not disturbing the antisoiling function of the TiO_2 layer then possibly being deposited where appropriate on this TiO_2 layer.

16. The process as claimed in claim 15, characterized in that the $ATiO_3$ underlayer (UL) and the TiO_2 layer are deposited in succession at room temperature by vacuum sputtering, where appropriate magnetron and/or ion-beam sputtering, in the same chamber, the targets used for depositing said underlayer being chosen from $ATiO_3$, $ATiO_{3-x}$, where $0 < x \leq 3$, and ATi, the supply being a radiofrequency supply and the atmosphere in the sputtering chamber containing only argon when $ATiO_3$ is used as target, the supply being a DC or AC supply and the reactive atmosphere in the sputtering chamber containing oxygen and argon when ATi or $ATiO_{3-x}$ is used as target; and
the target used for depositing the TiO_2 being Ti or TiO_x, where $0 < x < 2$.

17. The process as claimed in claim 16, characterized in that no heat treatment step is carried out after the TiO_2 layer and, where appropriate, the overlayer(s) have been deposited.

18. The process as claimed in either of claims 15 and 16, in which the coating of a glass or glass-ceramic substrate is carried out, characterized in that, before the underlayer (UL) has been applied, at least one layer forming a barrier to the migration of alkali metals present in the glass or glass-ceramic is deposited on the substrate, an annealing or toughening operation then possibly being carried out, after the TiO_2 layer and, where appropriate, the overlayer(s) have been deposited, at a temperature of between 250°C and 550°C, preferably between 350°C and 500°C in the annealing operation, and at a temperature of at least 600°C in the case of the toughening operation.

19. The process as claimed in one of claims 15 to 18, characterized in that, before the $ATiO_3$ underlayer (UL) has been applied, at least one functional layer chosen

from layers having an optical functionality, thermal control layers and conducting layers is deposited, said functional layers being advantageously deposited by vacuum sputtering, where appropriate magnetron and/or ion-beam sputtering.

20. Single or multiple glazing comprising, respectively, one or more than one structure as defined in one of claims 1 to 13, both the TiO_2-based antisoiling layer and its associated underlayer (UL) being present on at least one of its external faces, the faces not having the TiO_2-based antisoiling layer and its associated underlayer possibly including at least one other functional layer.